

What is claimed is:

5 Subal 1. A device for installing muntin bars or a muntin grating into a frame, as for example a spacer frame of an insulated glass window, comprising:

a device for realizing an accurate graded positioning of the muntin bars or the muntin grating within the spacer frame and also for an accurate junction provided there between,

10 a rectangular mounting frame having four frame pieces, which frame is inclined with respect to the vertical plane,

tie-bars movably supported by said frame for fixing and machining spacer frames of different sizes together with respective muntin bars, i.e. a respective muntin grating, and

15 an apparatus for arranging and fixing said muntin bars or the muntin grating in the spacer frame of for example an insulated glass window.

20 2. A device according to claim 1, wherein ^{1.46} the angle of inclination of the mounting frame is between 0 and 90 degrees.

25 3. A device according to claim 1, wherein the mounting frame comprises two parallel, particularly horizontally arranged fixed frame bodies and two parallel side bodies arranged rectangular to the two frame bodies and connecting the latter ones, wherein the tie-bars in turn comprise two upstanding tie-bar bodies which are supported by the frame bodies and two transverse tie-bar bodies positioned
30 rectangularly to the upstanding tie-bar bodies and supported by the side bodies.

35 4. A device according to claim 3, wherein at least one of the upstanding tie-bar bodies is movably supported and wherein at least one of the transverse tie-bar bodies is movably supported.

5. A device according to claim 1, further comprising a basis frame onto which the mounting frame is to be arranged, wherein the mounting frame is provided with at least one frame stretcher pivotally connected thereto, so that the mounting frame can be adjusted with respect to its angle of inclination.

6. A device according to claim 5, wherein the basis frame comprises footings.

7. A device according to claim 6, wherein the footings are adjustable with respect to their length.

8. A device according to claim 3, wherein the two transverse tie-bar bodies form an upper and a lower tie-bar, respectively, and are arranged above or beneath said tie-bar bodies which are positioned rectangularly thereto and which form a left hand side and a right hand side tie-bar, respectively.

9. A device according to claim 3, wherein the tie-bar bodies comprise movably supported fixing devices for enabling the spacer frames having different sizes to be positioned and centered along with the respective muntin bars or said muntin grating.

10. A device according to claim 3, wherein the tie-bar bodies comprise screwing apparatuses and/or shooting devices being movably supported relative to the spacer frame and the muntin bars or the muntin grating, by means of which the muntin bars or the muntin grating are fixed to the spacer frame by using screws, nails or clamps.

11. A device according to claim 10, wherein by means of a controlling unit, both the tie-bar bodies and the movably

supported fixing devices and the screwing apparatuses and/or the shooting devices can be automatically moved with respect to the size of the spacer frame and the position of the respective muntin bar to be installed into said frame, wherein said movements can be performed simultaneously or successively.

12. A device according to claim 10, wherein the screwing apparatus or the shooting device is provided as an independently working and adjustable unit comprising at least a device for screwing or shooting so-called "Spaxscrews" and a movably carried distance positioning supporting device for the muntin bar or the muntin grating to be screwed or shot, and a positioning laying-on device for the frame to be able to preposition an end of the muntin bar relative to the inner surface of the spacer frame profile.

13. A device according to claim 12, wherein the distance positioning supporting device comprises a gripping jaw device for fixedly gripping the muntin bar or the muntin grating in a position in which ^{LAB}it is to be screwed or shot with respect to the spacer frame, by means of which gripping jaw device the muntin bar or muntin grating is gripped at least during the screwing or shooting process with respect to ^{LAB}the longitudinal direction of the tie-bar bodies.

14. A device according to claim 12, wherein the distance positioning supporting device also serves for centering the muntin bar or the muntin grating relative to the screwing apparatus of the shooting device.

15. A method for installing muntin bars or muntin gratings into a frame, i.e. a spacer frame of an insulated glass window by using the device according to any one of claims 1 to 14, i.e. including a device for realizing an accurate graded positioning of the muntin bars or the muntin grating

within the spacer frame and also for an accurate junction provided there between and comprising the steps of

positioning a spacer frame of desired size onto the tie-bars of the mounting frame and

5 fixing a plastic terminal plug within one end of a muntin bar, i.e. a muntin grating end, so that an end flange of the plug abuts against the inner side of the spacer frame, and

fixing said plug, i.e. the muntin bars or the muntin cross fixed thereto at determined positions to the spacer frame profile by screwing or shooting screws or shooting clamps through the hollow profile of the spacer frame from the outside thereof, respectively, which screws or shooting clamps are provided by means of a screwing apparatus or a shooting device movably supported relative to the spacer frame.

16. A method according to claim 15, wherein the screwing apparatus or the shooting device is automatically positioned relative to the spacer frame.

17. A method according to claim 15, wherein positioning the muntin comprises the step of

fixing the muntin bar or the muntin grating to the spacer frame by means of a gripping jaw device which is to be adjusted by means of a pneumatic or hydraulic plunger which in turn is fixedly connected to a claw unit and

scanning the surface of the spacer frame supported by the positioning laying-on device for the frame relative to the screwing apparatus or the shooting device.

18. A method according to claim 17, further comprising the step of

coordinating the scanning operation with the movement of the tie-bars at which the screwing apparatus or the shooting device is arranged, wherein the movement of the tie-bars is

especially performed vertically and horizontally with respect to the spacer frame and

triggering the movement of the sliding block of the screwing apparatus or the shooting device against the outer wall of the spacer frame profile after having reached a
5 determined screwing- or shooting position and thus triggering the screwing or shooting operation.

19. A method according to claim 15, further comprising the
10 step of automatically supplying said screws, nails or fixing clamps of the screwing apparatus or the shooting device by means of a air hose connection.

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